

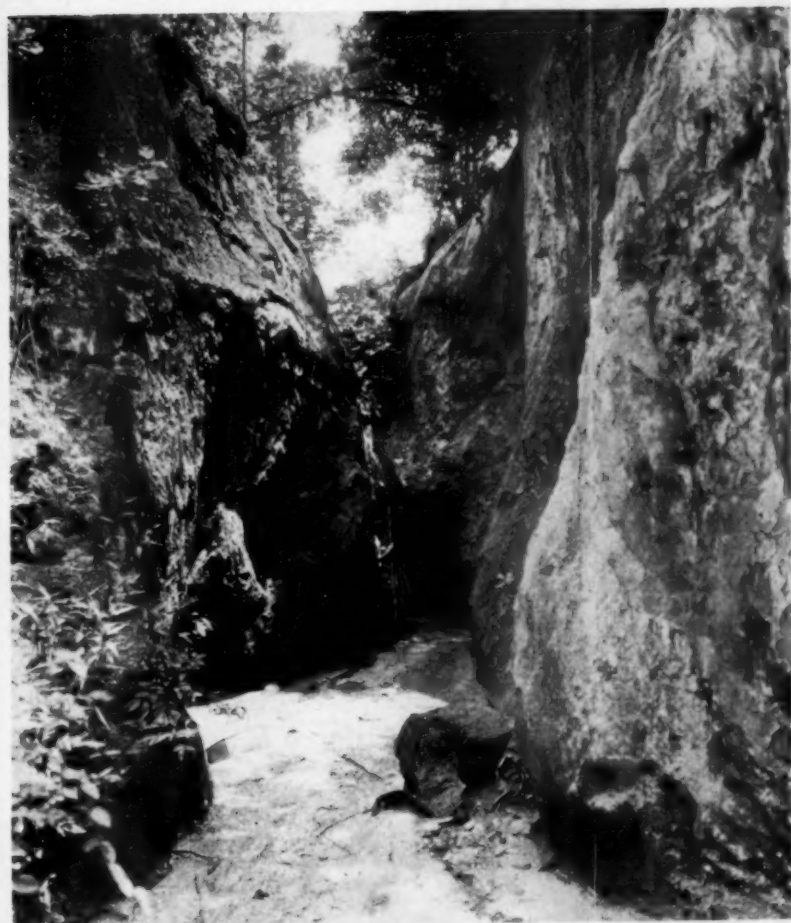
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# SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE •



SEPTEMBER 5, 1936

Left by the Plow

See Page 159

A SCIENCE SERVICE PUBLICATION

## SCIENCE NEWS LETTER

Vol. XXX

No. 804

The Weekly Summary of



## Current Science

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## DO YOU KNOW?

One tribe in China worships the dog, because of a legend that a dog once saved their mountain city.

The California sea mussel eats all the time but snaps its mouth shut instantly if any food poisonous to itself touches it.

Tires made from artificial rubber were exhibited recently at the International Automobile and Motor Show in Berlin.

Ancient Egypt had to import all of its incense of myrrh, pine resin, or laudanum, as no incense trees or shrubs grew in the country.

Some of the medieval ideas of the infernal regions, celebrated in poetry and art, can be traced to religion of the ancient Etruscans.

Yellowstone Park's most famous geyser, Old Faithful, broke its records for longest and shortest time between eruptions on June 20 when, departing from its almost perfect 65-minute schedule the geyser shot up once after 30 minutes and then waited 92 minutes for the next eruption.

Good housekeeping prevents disease; it also eliminates accident hazards, says a Maryland safety consultant.

Poisonous snakes often misjudge distance in striking at objects, according to Biological Survey scientists.

Soviet farmers in the Arctic raise such vegetables as cabbage, onions, peas, carrots, potatoes, and turnips.

In a battle with locusts, Argentina has learned that sodium arsenate is effective in poisoning these pests.

Germany, which has lately been taking half the world's annual supply of whale blubber, is building up a whaling industry of its own to get fats and oil.

Packing tests show that at least 20 per cent more apples can be stored in boxes in a given space than in baskets, and with less bruising.

A gangster among trees is the strangling-fig, says Dr. John K. Small, New York botanist, for this tree destroys its plant victims by enveloping them, and sometimes caps the climax by destroying itself.

## WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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How can a nasal spray act as a preventive of infantile paralysis? p. 148.

How much dust can there be with safety in the air of coal mines? p. 147.

## VITAL STATISTICS

Do many children die of suffocation? p. 153.

## PUBLIC HEALTH

# Hope For Saving Workers Exposed to Silica Dust

Experience of South African Mines Indicates That Engineering and Medical Preventives Are Successful

**H**OPE that the half million workers in the United States who are exposed to silica dust in dangerous amounts may be saved from silicosis appears in the discussions of dust diseases at the Harvard School of Public Health.

The effectiveness of dust control measures in preventing silicosis is seen in the experience of the South African gold mines as cited by Prof. Philip Drinker of Harvard.

"No new Rand miner who has entered the industry since August, 1923, has contracted silicosis," Prof. Drinker quoted from a South African report covering a ten and one-half year period. "These facts demonstrate that the engineering and medical measures which have been directed against silicosis have achieved a very significant degree of success."

In South Africa, and only there, it was realized at the outset, Prof. Drinker said, that dustiness would not be controlled properly unless measured and recorded routinely. Discussing various methods that have been devised for measuring the amount of harmful silica dust, Prof. Drinker said that a rapid method making use of a portable instrument was best for routine measurements.

## Dust Standards

The practical plant or mine manager wants an objective for his dust control, but unfortunately there are not and probably never will be exact figures to show a safe limit of silica particles in the air. Studies of the U. S. Public Health Service suggest some figures for dust standards. In the case of barre granite, a dustiness of ten to twenty million particles per cubic foot was found reasonably certain not to cause disability of the workers. In the anthracite coal mines, counts of 50 million per cubic foot, with five per cent quartz in the coarse dust, seemed safe.

Still another standard is desirable for the plant that handles dust of a kind that has not been proved a serious hazard to health. Scientists cannot give the manager of such a plant any figures, but

Prof. Drinker suggests that he investigate one of the many plants that have reduced dustiness without waiting for their workers' health to be affected by the dusty atmosphere. Generally, the manager and workmen of the clean plant will uphold eloquently the advantages of dust control.

## Progressive Disease

Once silicosis has developed, it is likely to progress, Dr. W. Irving Clark, physician to the Norton Company and assistant professor of industrial medicine at the Harvard School of Public Health, pointed out. The reason for this seems to be that in high concentrations silica is toxic and kills tissue. This progressive tendency of silicosis is a serious problem for industry. A worker, for example, may contract silicosis while working for one employer and may develop

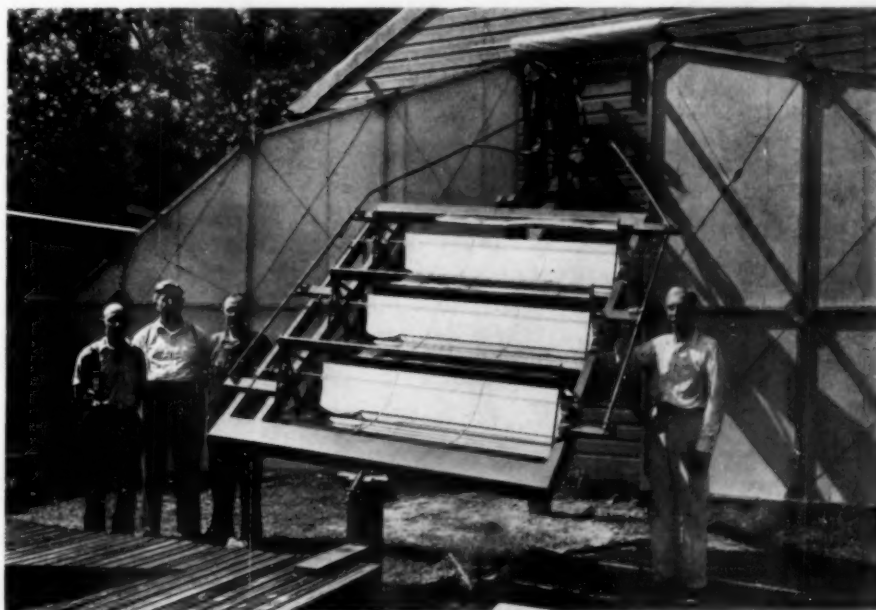
disabling symptoms many years later while working for another employer. If the work for the second employer involved exposure to dust of an inert nature, which affects the lungs slightly as seen in X-ray pictures but does not disable the patient, the second employer may have difficulty in proving that the dust in his shop was not the cause of the disability.

## Prevention Essential

Prevention is the only method of treating the lung diseases caused by dust, among which the most serious is silicosis. Dust must be eliminated from industry wherever possible, and when this is not possible the worker must use a protective device such as a respirator or a positive air pressure helmet. When examination shows the worker's lungs have become affected by the dust, it is best to keep him at work but in a non-dusty department. As shortness of breath increases, lighter work must be given him.

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Since a grasshopper can lay from 25 to 100 eggs, farmers figure that they are reducing next year's pests by at least 25 hoppers, when they destroy a female grasshopper before egg-laying time.



**SUN COOKER**

Changed in form and improved over previous models is the solar heater of Dr. C. G. Abbot, Secretary of the Smithsonian Institution, which will operate a one-half horsepower electric motor as an exhibit during the meeting of the Third World Power Conference in Washington, Sept. 7-12. Shown above is Dr. Abbot (right) and his assistants (left to right) L. A. Fillman, L. B. Clark and R. M. Claggett. (See SNL, Aug. 8.)



## PUBLIC HEALTH

# Survey Birmingham, Alabama, For Value of Spray for Polio

## Health Officials Make House-To-House Canvas In Hope Of Finding Out Whether This Measure is Preventive

**T**HE CITY of Birmingham is in the midst of being a "guinea pig" in the interest of medical science's fight against poliomyelitis.

A house-to-house survey of representative sections of the city is being directed by Dr. Charles Armstrong of the U. S. Public Health Service to determine the percentage of the city's population using the nasal spray he devised as a possible protective measure. Tabulations of this survey will be checked with proportions of the population having the disease.

Although there are not enough cases in the city to make a conclusive showing in the final results of the survey, Dr. Armstrong expressed hope that some indication of the effectiveness of the spray can be gathered.

There is a possibility that health authorities may wait for more cases to develop, although Dr. Armstrong said the epidemic reached its peak in Alabama during the week of July 25. He expressed the desire to get "the maximum amount of available evidence."

Dr. Armstrong said that although the epidemic had reached a normal peak, he couldn't say what would have happened if the spray had not been used.

The secret of why the picric acid-sodium alum nasal spray can protect monkeys and, perhaps, human children against infantile paralysis lies in its ability to coagulate protein, just as acid curdles milk.

Experiments showing that it is probably this coagulation process which gives the spray its effectiveness are described by Drs. Charles Armstrong and W. T. Harrison of the U. S. Public Health Service, National Institute of Health (*Public Health Reports*, Aug. 14, 1936).

The membranes that line the nose and the mucous secretions that coat these membranes are protein in character. The spray presumably coagulates these proteins, making a tough coating something like the clot of well curdled milk or like hard cooked egg white. The infantile paralysis virus, it is thought, cannot get through this coating and so cannot reach the olfactory nerve by means of which

it ordinarily reaches the nerve centers where it does its damage.

In the experiments just reported, Drs. Armstrong and Harrison found that a picric acid-sodium alum spray, which coagulated a serous fluid from the body into such a firm clot that the tube containing the mixture could be inverted without spilling a drop, protected monkeys from infantile paralysis virus placed in their noses after being sprayed. A less acid solution of the spray, which did not clot the serous fluid, failed to protect the experimental animals.

This report not only explains how the spray achieves its protective action but indicates the need of using, for protection of humans, only a spray prepared according to Dr. Armstrong's formula.

On the question of whether vaccine treatment is useful, medical science is yet unable to say "yea" or "nay" even after an intensive year of attack on the dread disease of infantile paralysis by the use of vaccines, in which nearly 20,000 children and adults throughout the nation have been treated. Nor do scientists know whether it is a harmful, dangerous procedure.

In an editorial, the *Journal of the American Medical Association* (August 29) reviews the problems of vaccination for infantile paralysis but is unable to give a distinctly positive or negative answer.

*Science News Letter*, September 5, 1936

## CLIMATOLOGY

## Heat Records for 117 Years Broken in State of Iowa

**H**EAT records for 117 years in Iowa have gone down with a crash this summer, as records for intense and continuous cold splintered on last winter's ice.

A statistical survey of the heart of the corn belt, county by county and town by town, conducted by Charles D. Reed of the U. S. Weather Bureau office, has shown that in the short space of about six months, Iowa has experienced the most prolonged severe cold and the most

prolonged severe heat since Americans first settled in the territory and began keeping records, away back in 1819, a few years after Thomas Jefferson had "put across" the Louisiana purchase.

It is a confirmation, in sober meteorological data, of the school boy's unconsciously ironic definition of the temperate zone as "the part of the world where it gets awfully hot in summer and awfully cold in winter."

While Mr. Reed conducted his study strictly within the boundaries of his own jurisdiction, many of his figures are of interest outside the state, for as all midwesterners are painfully aware, the heat was by no means confined to Iowa.

Every locality in the state has some new kind of record to gasp over.

### Hottest 37 Days

Many towns will date their "hottest ever" days from the summer of 1936; others will have records of hottest two days, hottest three days, hottest week, hottest two weeks, and so on up to hottest 37 days. At this point Mr. Reed quit simply because he hadn't any more space on his tables, and because his office force was all worn out with adding up and averaging endless piles of data.

Along with heat went terrific evaporation rates. The official evaporimeter on the campus of the State College at Ames showed a total evaporation of fourteen and three quarters inches for the month of July. This is within two tenths of an inch of the record evaporation at Tribune, Kansas, out where it is supposed to be really dry.

The hottest afternoon that the state as a whole ever experienced was on July 14, of this year, when the average maximum temperature at 113 observing stations was 108.7 degrees. This is 2.3 degrees higher than the previous record heat, of the afternoon of August 3, 1930. On other days even higher temperatures were experienced in some parts of the state, with the mercury climbing as high as 113 to 117 degrees. The temperature map for July 14 shows that no county escaped heat of more than 100 degrees, and that most counties had to put up with 110 degrees or worse.

This year's poor corn crop is blamed by Mr. Reed more on the terrific heat than on drought. Water in the soil was short, to be sure, but the crop got along rather well until the heat was turned on. The corn did not perish of thirst, it was burned to death.

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## PHYSIOLOGY

# Measures Temperature Change In Brain While It Works

**Illuminating Eyes Warms Brain's Optic Pathways  
One Hundredth Degree; Pressure Heats Touch Centers**

**M**EASURING the heat of a brain-wave is the latest achievement of Dr. R. W. Gerard of the University of Chicago, who 10 years ago, with Dr. A. V. Hill, British Nobel prizeman, first measured the heat of a nerve message.

In the past four years much attention has been aroused since scientists found it possible to measure the electricity which the brain produces when it works. More recently, Dr. Gerard reported to the American Physiological Society, the amount of oxygen used by portions devoted to the senses of sight and touch has been measured. He has now been able, with a thermometer which records a change in temperature of 0.00075 degrees Centigrade (0.0014 degrees Fahrenheit) to measure the temperature changes of the living brain.

## Electric Thermometer

The thermometer is an electrical one, and the "bulb" is the size of a fine

needle. This is inserted into the particular part of the brain of the laboratory animal to be studied. When it is desired to find out the heat involved in seeing, the needle goes into the paths that lead from the optic nerves and the eye, for instance, where it is located within one twenty-fifth of an inch.

## Vision Makes Heat

Illuminating the eyes of the experimental animal, the experimenters found that these optic pathways in the brain began, within a minute, to get warmer. For two minutes more the temperature rose, until it was a hundredth of a degree above normal for the resting brain. Four minutes after this, the temperature was again that of the resting brain.

The Chicago physiologists found a similar response to pressing the paw, when the tiny thermometer bulb was placed in that part of the brain which has to do with touch. In some parts of

the brain, both pressing and "seeing" had the effect of raising the brain temperature.

The investigators have evidence that these changes in the brain temperature are in part due to an increase of blood flow to the portion of the brain used in sight, when the eye is illuminated, and to that portion which is used to distinguish touch when the animal is pinched; but in part due to the actual work done by the nerve cells in the brain.

## Anesthetic Brings Change

Further experiments showed that more blood goes to the brain when there is too little oxygen or too much carbon dioxide in the blood. When their animals were anesthetized with ether, the scientists found that the brain temperatures rose five-hundredths of a degree, but when the anesthesia was brought about by the chemical nembutal, this was reversed, and the brain temperature went down.

H. Serota collaborated in the researches with Dr. Gerard.

Scientists hope that experiments of this nature will eventually lead to a better understanding of how our brains work, for example, in the process of understanding.

*Science News Letter, September 5, 1936*

## MEDICINE

## New Infant Burn Room Opened in Ohio Hospital

**S**CREAMING children brought to the General Hospital in Cincinnati when suffering from painful burns and scalds soon are made to laugh and temporarily forget their injuries in the new burn-treatment room recently opened. Swifter and easier emergency treatment in the crucial initial stages of burns is the result.

Animal cut-outs of fairyland characters dot the walls. Tubs for bathing the children with soothing liquids are in brilliant colors as are the tile floors. A huge electric kaleidoscope flashes hundreds of colored designs on the walls.

Dr. H. Jerry Lavender of the hospital staff designed the so-called "fun room," which is working out successfully. A visit to the hospital shows children, many of them convalescing from serious burns, in high spirits, laughing and shouting about Peter Rabbit, Little Bo Peep, Humpty Dumpty and the more modern Mickey Mouse whose antics are pasted on the walls.

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## HAPPY AGAIN

Infants in special "burn" room at General Hospital at Cincinnati, O., forget their suffering and thus aid physicians to obtain speedy treatment. They are bathed in soothing liquids, as shown above, in brilliant-hued tubs.

## CHEMISTRY-PHYSIOLOGY

## Succeed In Making Vitamin B<sub>1</sub> By Laboratory Methods

**A**RTIFICIAL production by chemical methods of vitamin B<sub>1</sub>, the beriberi preventing vitamin, has finally been achieved by Dr. R. R. Williams of the Bell Telephone Laboratories and Dr. J. K. Kline of the Research Laboratories of Merck and Company. Collaborating in the research leading up to the vitamin synthesis, part of which was done at Columbia University and part at the laboratories of Merck and Company, were Prof. H. T. Clarke, Dr. E. R. Buchman and R. E. Waterman and A. E. Ruehle.

The vitamin, it is claimed, can be produced much more cheaply by the synthetic process, difficult though it is, than by previously developed methods of extracting it from natural sources.

All higher plants synthesize vitamin B<sub>1</sub>, but Dr. Williams and co-workers did not follow the plant method of

manufacture in producing the vitamin in their laboratories. Instead they worked from simple chemical molecules, building them up step by step into the complicated molecule that is vitamin B<sub>1</sub>. The synthetic product they achieved confirms the chemical picture of the vitamin molecule which Dr. Williams recently announced.

The synthesis is effected by combining 2 methyl 5 brom methyl 6 amino pyrimidine with 4 methyl 5 beta hydroxy ethyl thiazole. The former is somewhat related to the hypnotic Barbitol; the latter is a pyridine-like sulfur containing substance more or less akin to certain of the agents used in accelerating the vulcanization of rubber and in the sensitization of photographic plates. Each of these, however, is a new substance and every atom must be in its proper place.

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kind of drug in treating these poisoning cases.

Carbon monoxide is an odorless gas which gives its victim no warning but kills by asphyxiating. The gas drives oxygen out of the blood by combining with the oxygen carrier hemoglobin. Carbon monoxide combines chemically with hemoglobin just as oxygen does but 300 times more readily. It does no evident harm to the blood itself and, as Dr. Drinker emphasized, the patient who recovers very rarely suffers any ill effects. This point is of importance in connection with damage suits which are sometimes brought by those who have been poisoned in the course of their work, bus drivers or garage workers, for example.

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## MEDICINE

## New Method Found for Treating "The Bends"

**A**N IMPROVED method of treating a compression illness or the bends which frequently occurs when divers and others who have been working under high atmospheric pressure return to normal atmosphere was described by Louis A. Shaw of the Harvard School of Public Health at the symposium held as part of the Harvard Tercentenary Celebration.

In this disease nitrogen gathers in the blood vessels and forms bubbles there. If these bubbles are not dissipated they will stop the blood circulation. Prevention of the disease is sought by returning the worker slowly to normal atmospheric pressure. Sometimes, however, in spite of this preventive measure symptoms of the disease appear several hours after the worker has been decompressed or returned to normal conditions.

Recompression, putting the patient back under the high pressure, is the method generally used for treating recurrence or late appearance of the bends. Mr. Shaw suggested that instead of this, the patient should be put in an atmosphere of no more than 30 pounds pressure to the square inch, for from two to three hours.

Then the pressure is lowered to 20 pounds for an hour and a half during which period the patient breathes pure oxygen instead of air. This method will promote the absorption of the nitrogen bubbles.

Mr. Shaw reported studies on dogs which showed the value of substituting oxygen for ordinary air in treating compression illness.

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## MEDICINE

## Monoxide Poisoning Seldom Causes Nervous Illness

**C**ARBON MONOXIDE poisoning almost never causes mental or nervous illness, Dr. Cecil K. Drinker, dean of the Harvard School of Public Health, told public health experts at a symposium held as part of the Harvard Tercentenary celebration.

This is contrary to the general medical and legal opinion but Dr. Drinker presented figures from a ten-year experience in New York City to prove his point. Between 1925 and 1934 there were 21,000 cases of carbon monoxide poisoning in that city. Of these only 39 persons subsequently showed signs of mental or nervous derangement.

"Following carbon monoxide poisoning a person either dies or gets wholly well, except in very rare instances," Dr. Drinker said.

If carbon monoxide poisoning resulted in mental or nervous illness the New York mental disease hospitals would be filled with such patients, Dr. Drinker commented, but this is not the case. About 1,500 carbon monoxide

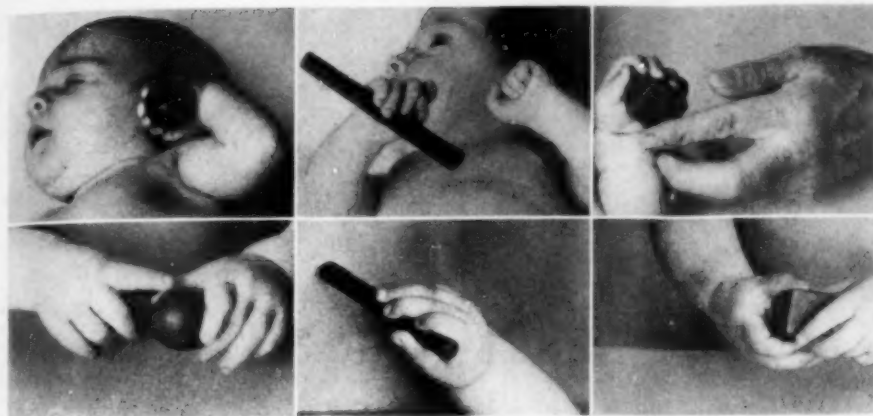
deaths occur yearly throughout the United States. About two thirds of these are probably suicides, though there are no accurate figures on this point.

Improved methods of treatment reduced the yearly carbon monoxide deaths in New York City from 600 to 200 within the last ten years.

The method of treatment which has been so successful consists in having the patient breathe as soon after the accident as possible a mixture of 7 per cent carbon dioxide and 93 per cent oxygen. Fire and police department ambulances and the gas company emergency trucks all carry tanks of this gas mixture routinely. In addition to inhalations of this carbon dioxide-oxygen mixture, prone pressure artificial respiration is given to patients whose breathing is very bad.

Methylene blue injections into the veins has not justified itself as a method of treating carbon monoxide poisoning, Dr. Drinker declared. In Dr. Drinker's opinion it is not necessary to use any





## HANDS GROWING USEFUL

Typical grasps of babies under 6 months of age contrasted with the more advanced hold of babies in the second half year of life. At the left above, the baby holds a ball with his hand like a scoop, thumb and fingers side by side; below, the older baby can hold the ball with thumb and forefinger while the exploring forefinger of his other hand pokes it. Center, above, the young infant grasps a rod or crayon mostly with the little fingers; below, the older baby has it almost in a writing position. Right above, the block is held without any aid from the thumb; below, the older child uses thumb to good advantage in holding a block.

PHYSIOLOGY-PSYCHOLOGY

## Movies Aid in Study of How Baby Learns to Use Thumb

**T**HE THUMB has become subject of study at the Yale Clinic of Child Development.

Motion pictures of babies taken under the direction of Dr. Arnold Gesell have made possible the tracing of development from the time the infant's hand is curled up into a tiny, comparatively useless fist until his thumb is so developed that he can pick up an object, pincer fashion, between the thumb and forefinger. The results are now made public in a report by Dr. Gesell and Dr. Henry M. Halverson, (*Journal of Genetic Psychology*, June).

"Even though 'all thumbs' is proverbially synonymous with awkwardness, the human thumb is the most highly prized member of the entire hand," these scientists point out.

Legally, the thumb is assigned a higher compensation than any of the fingers. The U. S. Employees Compensation Commission allows compensation of 51 weeks' pay for loss of the thumb as compared with 28 weeks for the forefinger.

Scientists have pointed to the use of the thumb opposed to the forefinger as the one characteristic distinguishing all men from the apes.

Useful not only for securing free rides, the thumb has enabled man to hold fine tools such as the pen and has contributed mightily to the advance of civilization.

At birth, man does not have this use of the thumb. The fingers and thumb of the newborn are characteristically bundled into a tight little closed fist. First to come out of the bundle and work independently is the forefinger which begins a separate existence at about four weeks. The thumb starts individual action at about eight weeks, but it follows a slow road to complete independence of the rest of the hand.

Here are the steps as outlined by Drs. Gesell and Halverson:

1. Birth to 16 weeks. During this time the baby develops a slight ability to draw out the thumb, but it is generally held close to the fingers.
2. From 16 to 28 weeks. Now the space between thumb and forefinger widens and:
3. From 16 to 28 weeks. The thumb is brought against the fingers with its inside edge toward them.
4. From 24 to 36 weeks. Now the thumb can go around farther. It is partly the inside edge and partly the flat side

of the thumb that opposes the fingers.

5. From 32 to 52 weeks. It is not until the child is nearly a year old that the flat pad of the thumb is brought directly against an object or against an opposing finger.

The scientists point out, however, that these age ranges are only approximate and are likely to overlap to some extent.

## Make Your Own Test

Use of thumb and finger against each other in the pincer handling of objects depends upon the ability of the thumb to move freely in a circle. You can test yourself on this ability. Just band an ordinary pencil to your thumb so that the pencil point sticks out about two inches beyond the end of the thumb. Then lay your hand flat on the edge of a table so your thumb can move freely beyond the edge. Have someone hold a scratch tablet against the pencil point and draw a circle without lifting your hand. Repeat this experiment in a similar way for each finger. You will find that the thumb circle is much bigger than that drawn by any of your fingers. The one drawn by the little finger will be smallest.

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ARCHAEOLOGY

## Lapland Revealed as Warm in Stone Age

**M**ORE than 30 settlements of human beings dating from the Stone Age, or about the year 3000 B.C., have been unearthed in Swedish Lapland by Kurt Tinnberg, Stockholm archaeologist. In a few months he has gathered some 3,000 flint tools, weapons, and utensils, said to be the most northerly ever found in Sweden.

According to Mr. Tinnberg, researches show that the climate of Scandinavia in those distant days was warmer than now. He points to recent finds indicating that grapes grew there more than 4,000 years ago.

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## RADIO

September 8, 2:15 p.m., E.S.T.  
ONE THOUSAND USES FOR WOOD  
—G. W. Trayer of the U. S. Forest Service.

September 13, 2:15 p.m., E.S.T.  
STARRING A DINOSAUR—Charles W. Gilmore of the U. S. National Museum.

In the Science Service series of radio programs over the Columbia Broadcasting System.

## PUBLIC HEALTH

**Experts See No Harm In Auto Air-Conditioning**

**H**EALTH authorities do not see any hazard in a makeshift air-conditioning practice now in vogue in the torrid Midwest. The custom there is for motorists to refrigerate their cars by putting a block of "dry ice" on the floor and shutting all the windows. As the "ice melts," or evaporates, the air inside the car is cooled. A store in Des Moines, Iowa, specializes in "dry ice" for automobiles.

"Dry ice" is solidified carbon dioxide, so when the "ice melts," this gas passes into the air. This gas is normally present in the air in very small amounts. If the amount in the air reaches one per cent, animals and men begin to breathe a little faster and deeper. With two per cent carbon dioxide in the air, this effect is considerably increased, the breathing being much faster and deeper. At fifteen per cent, this effect is reversed, and the breathing is slowed. Breathing air with this much or more carbon dioxide for a few hours would make a person feel sick and would be dangerous.

However, long before this concentration is reached, Dr. R. R. Sayers of the U. S. Public Health Service explained, the motorist who refrigerates his car with dry ice will find himself breathing so uncomfortably fast that he will open his windows, allowing the gas to escape and thus averting any danger to himself or other occupants of the car.

*Science News Letter, September 5, 1936*

## CLIMATOLOGY

**18th Century Droughts Traced in Tree Rings**

**D**ROUGHTS that troubled farmers half a century before the Revolutionary War have left their records clearly written in the rings of New England trees, Prof. Charles J. Lyon of Dartmouth College has found (*Ecology*, July).

A tree ring represents the amount of wood grown in a given season. In a good year it is thick, in a droughty or otherwise bad year it is thin. Long-past alternations of good and bad years have been read successfully in other parts of the United States, particularly the Southwest, but hitherto the records from New England have been confused and contradictory. By studying a larger number of tree stumps, in several different loca-

tions in New Hampshire and Vermont, Prof. Lyon has at last been able to "make sense" out of early New England weather.

"Many years since 1600 are found to have been outstanding for the good moisture conditions available for plant growth," he states. "During the same three and a third centuries, about twice as many years are marked by actual physiological drought which retarded plant growth throughout the entire area. Cyclic effects are not evident."

In comparing his ring measurements with old weather data, Prof. Lyon found official rainfall records less valuable than early crop reports. Typical notes from years of narrow tree rings are:

1727: "Hay scarce on account of drought."

1736: "Corn scarce."

1741: "Hot and dry all summer."

1749: "Dry until July 25th."

1762: "Forest fires; public prayers and fast on account of the 'grievous drought.'"

*Science News Letter, September 5, 1936*

## PHYSIOLOGY

**Milk, Water, and Salt Hot Weather Health Aids**

**M**ILK, water, and salt are hot weather health aids, it appears from studies reported by Dr. Cecil K. Drinker, dean of the Harvard School of Public Health. Dr. Drinker discussed the effects on the body of high temperatures and humidities at the symposium on environment and its effect on man, being held as part of the Harvard Tercentenary celebration.

A man doing hard work in high temperatures must have plenty of food and water and he should take half an ounce of salt a day to replace the amount that will be lost from the body in perspiration, Dr. Drinker said. He can see no reason for limiting unduly the amount of protein food such as meat, eggs, and cheese.

High humidities and direct sunlight may intensify the heat effect and make you uncomfortable, but Dr. Drinker does not believe they are of great consequence so far as health is concerned. For the white man, life in the tropics depends on a severe discipline which is hard to maintain in the tropical climate. Dr. Drinker advises for white residents in the tropics a moderate amount of simple food, plenty of water, an adequate amount of salt, daily exercise, no alcohol or excesses of any kind, and plenty of sleep.

*Science News Letter, September 5, 1936*

**IN SCIENCE**

## BIOLOGY

**Bats Migrate Like Birds, Have Homing Instinct**

**B**ATS migrate like birds, though not to such great distances. Like birds, they know the way home again. Female bats have a second "home"—a nursery cave, where their young are born, and where males very rarely intrude.

These are among the results of an intensive study of bat ways conducted by Dr. Martin Eisentraut of the University of Berlin. (*Forschungen und Fortschritte*, July 10-20).

Dr. Eisentraut attached identifying bands to over 6,000 bats, after the manner of banding birds. He did this while the bats were in their winter quarters in two places in central Germany. Captured and reported subsequently, the bats showed migration tendencies principally toward the north and east, but their range was not great. In no case did it exceed 300 miles, and many of the little animals did not fly more than four or five miles from the winter cave.

In winter quarters, male and female bats share the same caves, hanging in great clusters from the ceiling and wall projections. But the nursery cave is distinctly a "no man's land"; male intrusions are probably mostly accidental.

Bats' ability to find their way back to the home cave after their summer wanderings indicates a strong locality sense, comments Dr. Eisentraut. This is doubly developed in the females, which must keep track of the location of the nursery cave as well as the over-wintering cave.

*Science News Letter, September 5, 1936*

## ENGINEERING

**Molasses Used for Roads To Make Dustless Surface**

**M**OLASSES is being mixed with surface soil on the roads of Mysore Province in India to produce a cheap highway that is dustless, wear-resisting and impervious to all but the heaviest rains, states a report to the U. S. Department of Commerce.

*Science News Letter, September 5, 1936*



# IE FIELDS

DENDROLOGY

## Street Lights Cause Delay Of Autumn Loss of Leaves

**I**F YOU have a street light and a shade tree close together, in front of your house, watch the leaves on the branches nearest the lamp, when the tree begins to lose its foliage this fall. The chances are that the branches getting the most light will keep their leaves longest.

Observations on the behavior of night-lighted street trees have been made by Dr. Edwin B. Matzke of Columbia University. He reports (*American Journal of Botany*, June) the retention of leaves by the most strongly illuminated branches, considerably past the date of leaf-fall from the rest of the tree. His studies were made on Carolina poplar, two species of sycamore, and the crack willow—all trees able to survive the somewhat unfavorable conditions of New York City streets.

The poplar eventually lost all of its leaves in the normal way, but the leaves of the two sycamore species clung fast to the tree until frozen to death.

A relatively weak light, as much as 45 feet from the tip of the nearest branch, was able to cause retention of numerous leaves. Light intensity as low as one foot-candle or less may be effective, Dr. Matzke states.

*Science News Letter, September 5, 1936*

VITAL STATISTICS

## Accidents Exceed Disease In Child Fatalities

**M**ORE than twice as many children under 15 years are killed by accidents as by three common communicable diseases, measles, scarlet fever and diphtheria. This fact emerges in a study of fatal childhood accidents which has been undertaken by the U. S. Public Health Service. First section of the study, relating to automobile accidents, has just been reported by William M. Gafafer, senior statistician of the federal health service.

For children under one year of age mechanical suffocation leads the list of fatal accidents. At one and two years burns caused most fatal accidents. Auto-

mobile accidents and burns lead at three years. At four years and from then up to fifteen years, automobile accidents rank first as cause of accidental deaths. The study was limited to year 1930, most recent year for which accurate population enumerations exist.

Dr. Gafafer divided the country into four geographic regions, Northeastern, North Central, Southeastern and Western, and reviewed the fatality figures region by region.

The Northeastern region had most childhood automobile deaths per hundred thousand children. Next greatest number was found in the Western region. Then followed the North Central and finally the Southeastern with fewest deaths per hundred thousand children. This order was changed when the regions were rated according to deaths per hundred thousand registered automobiles or per 50 million gallons of gasoline consumed. Using these measures of mortality, the Northeastern region still led with most deaths, followed by the Southeastern, the North Central and finally the Western regions. The reason for the change in order, Dr. Gafafer explains, is that the Western region has more automobiles in relation to the number of children, and there is no subsequent change when gasoline consumption is considered because the number of gallons consumed per automobile varies but little in the different regions.

*Science News Letter, September 5, 1936*

PSYCHIATRY

## Mental Disease Strikes All Nationalities Alike

**F**OREIGN-BORN persons in New York State are no more subject to mental disease than are native Americans, if allowance is made for difference in age and environment, reports Dr. Benjamin Malzberg, of the New York State Department of Mental Hygiene (*American Journal of Psychiatry*, July).

Although the average annual rates of first admissions to mental hospitals seem to indicate that the cases of mental disease among foreign-born are twice as numerous as among native Americans, these figures are misleading, Dr. Malzberg declares. The foreign-born are older, on the average, than the natives and consequently have had more chance to develop mental disease. They are also more concentrated in cities, where mental disease, or at least hospitalization for it, is more common.

*Science News Letter, September 5, 1936*

METALLURGY

## Steel Failure Caused By Crystallites in Metal

**S**AFETY in skyscrapers, or bridges, and on the highways, depends upon how correctly engineers can estimate the strength of steel.

One way of learning something about this vital matter is to place a steel bar in a special machine which pulls it apart and records the strength of pull necessary to do this. Then the engineers see to it that a bar of this kind will only have to stand a small fraction of this rupturing strain.

But sometimes after long use, a steel part may fail even though the forces involved have been well under the supposed breaking point. "Fatigue failure," it is called.

Why is it that steel (and other materials, too) possesses this very human characteristic of getting tired? Two English physicists, Dr. H. J. Gough and W. A. Wood, are among those who have given an answer.

To find out what was going on inside of pieces of steel they shot penetrating X-rays through them. Reflected onto a photographic plate, the rays formed a pattern which showed that the solid bar was really a structure of minute grains—hundreds of them to the inch.

Then they subjected the steel to all sorts of maltreatment and watched the X-ray patterns closely. Long before a piece broke, a breakdown of its internal structure could be seen developing.

In a fresh piece of steel the grains are arranged in a way which gives great strength to the mass as a whole. But violent strains continued long enough may produce changes. The grains seem to go to pieces at the boundaries, breaking up into much smaller grains—so small that tens of thousands would only line up to an inch.

These tiny "crystallites" (as they are called) are not regularly arranged as are the initial grains. The steel loses its virgin strength.

Fortunately, however, scientists Gough and Wood found that there is a safe maximum strain under which no amount of abuse seems to cause this crystalline disintegration.

It is incorrect to speak of "crystallizing" as a cause of steel failure. Steel always has a crystalline structure. But when fatigue occurs, larger crystals break down into much smaller ones, according to these investigators.

*Science News Letter, September 5, 1936*

ANTHROPOLOGY-PSYCHOLOGY

# Do You Talk With Your Hands?

**You Probably Do—More Than You Realize—Though the Average American's Gestures Lack European Freedom**

By DR. FRANK THONE

**D**O YOU talk with your hands? Of course not. You're a typical average American, and Americans don't gesticulate. Only foreigners do that.

But wait a minute. If you really are a typical average American you do gesticulate. Americans talk with their hands a good deal more than they realize. Only, presumably, we have become so used to our gestures that they "don't count." They fit into the pattern of our lives as thoroughly as English speech fits in, or the habit of saying "yeah" or "uh-huh" instead of "yes." It is universal human nature not to notice the most familiar things.

Backing for the declaration that Americans are gesticulators comes from a solidly established scientific source: Prof. Franz Boas, Columbia University's veteran anthropologist.

Says Prof. Boas: "The common assumption that Americans do not gesticulate is not correct. Even aside from the well-known oratorical gestures we are fairly lively. Most of our gestures may be designated as descriptive. We supplement our speech with movements that indicate the form of what we are talking about."

Nevertheless, he admits, we are rather moderate in the use of gesticulation as compared with some other races. Our shoulders are not so eloquent as a Frenchman's, our arms as an Italian's, our hands and fingers as a Jew's.

## Environment Important

Prof. Boas turned up a number of very interesting racial trends in the use of gestures in the course of a program of research designed to discover whether races of men move differently as well as look differently. The results disclosed quite definite differences correlated with race; but they also disclosed that changed environment is followed by gesture-habit changes, just as the offspring of European parents brought up in America are usually taller and stouter than the immigrant generation, and frequently even have differently shaped heads. Thus both heredity and environment contribute a share toward your

own manner of talking with your hands.

Prof. Boas collaborated with two younger associates, Dr. David Efron, attaché of the Institute of Psychology, University of Buenos Aires, and the artist Stuyvesant van Veen. They used a method for obtaining a graphic record of gestures that was at once simple, reasonably exact, and very effective. They took motion pictures of subjects of various racial origins. These they projected on a screen, one frame at a time. From selected frames thus "frozen" they had sketches made of the movements they were interested in analyzing. The resulting diagrams are as lively as life.

## Whole Body Talks

Two racial groups he found particularly interesting were Italians and Jews—races proverbially given to the free use of the most eloquent and expressive kind of gesturing. Gesticulation with them is not merely "talking with the hands," it is talking with arms, head, neck, back—the whole body talks. And there is as much difference between the

two types of gesticulation as there is between the Italian and Yiddish languages.

"Italian gestures," says Prof. Boas, "are characterized by a wide symmetrical sweep from the shoulders. Furthermore they are symbolical. The gestures have definite meanings, many of which can be traced back to antiquity."

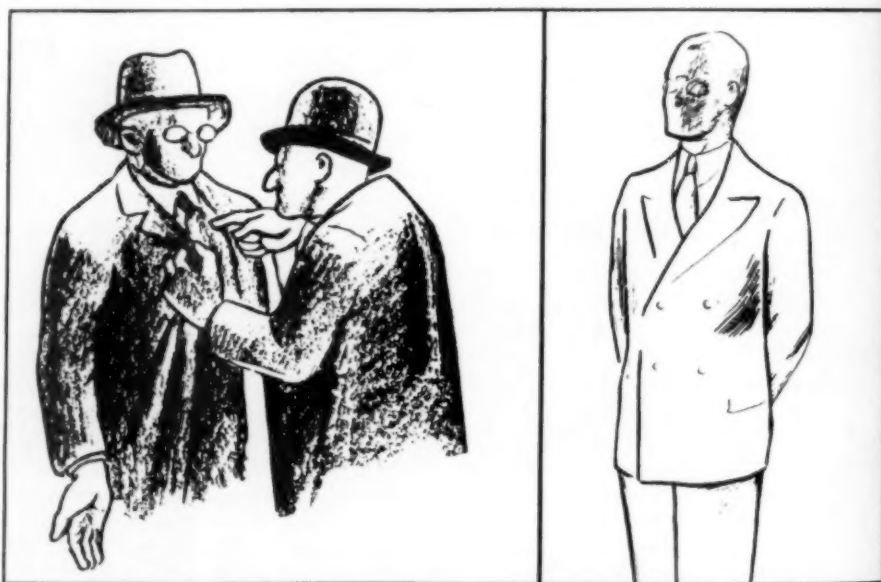
"'It is good,' 'I am hungry,' 'prison,' are represented by definite symbols. For this reason Italians are able to converse in pantomime without uttering a single word."

## Characteristic Posture

"Their posture is characterized by an easy relaxation of the shoulders and a strong forward curvature of the lumbar region. At the same time the elbows are held backward. There is also a preference for holding the wrist of one hand with the other, both being held behind the back."

As different as can be imagined from Italian gestures, with their sign-language as definite as an Indian's, is the Jewish mode of "hand-talk."

"By contrast, the Jewish gestures are jerky," continues Prof. Boas. "The wide sweep of the Italian is absent. Generally the two hands do not move symmetrically. The elbows are almost sta-



## CONTRASTS

At the left you see "buttonholing," a characteristically Jewish gesture though by no means confined to that race. Note the slumped shoulders of the argumentative one. At the right, 100 per cent American? Surely. Yet this upstanding, gestureless gentleman is also a Jew. His family, of German origin, have lived in the South for several generations.



tionary, close to the body, and the movements are made with forearm and fingers. They are emphasized by movements of the head. They are not graphic, but follow lines of thought. Since very few of their gestures are symbolic, pantomimic conversation without words is impossible.

By contrast with the Italian, the Jew tries to get in touch with his friend. He will even grasp his friend's hand and gesticulate with that.

"The posture is characterized by a slump of the neck and a relaxation of the knees."

### America Modifies

So much for types, and the contrasts between the types. Racial characteristics in gesture are found in "pure" form only among the first-generation immigrants, and among their American-born offspring if they have become segregated in large "foreign islands" like New York's lower East Side. As soon as one race makes contact with another that has different gesture-habits, modification begins: here also the melting-pot is at work.

The process carries through to a remarkable degree of completeness in some instances. Some of Prof. Boas's pictures are almost "still life" studies, so few were the gestures the speakers made, despite their Jewish origin. The secret was that these men were descendants of early immigrants who had prospered, given their descendants economic and educational advantages, and thus projected their family strains into the mainstream of American life. So their fourth or fifth generation grandsons stand in courtroom or lecture hall, speaking easily yet using so few gestures that their very absence is noticeable.

The process works the other way

around, too. If a non-gesturing person lives long enough among people who do a great deal of their talking with their hands, he presently "learns the language." Even Englishmen will do it. Prof. Boas found one Englishman who had been reared in Italy and was married to a Jewess. He gesticulated freely—but his gestures were a curious combination "dialect" combining both Italian and Jewish qualities!

Another case of a man adopting gestures quite alien to his race is related by Prof. Boas. This is a young man, son of a Danish father and an Irish mother. He was born in a small town in upstate New York, which had no Jewish population. But from his thirteenth year on, he has been closely associated with second-generation, "semi-assimilated" Jews. He walks like them, with a notable slump. He talks like them, in fluent Yiddish. And all his gestures are Jewish.

### English Once Gesticulators

If instead of examining the strangers at our gates and the still half-stranger brethren within them, we could only set the clock back to our own English forebears of three or four hundred years ago, we might find some interesting "foreigners" there, too. Englishmen of Shakespeare's time were free gesticulators, and it is hard to imagine the Merry Monarch and his subjects going about glumly with their hands in their pockets. For one thing, they hadn't any pockets.

(Which rouses a question not discussed by Prof. Boas: do the pocketless peoples of the earth gesticulate more?)

Another thing: persons whose professions involve making or drawing things are very apt to carry the techniques of their craft into their gestures. Thus, notes Prof. Boas, many painters accom-

### LANGUAGE

*You may not understand the Yiddish word for "No!" but you can get the idea expressed by the man at the left. "La barbe," the Frenchman calls the gesture depicted in the center. Flipping the beard is a way of saying "I don't care." The Italian gesture at the right is understood in all lands where men gather to drink.*

pany their speech by movements which imitate the motions of the brush in painting.

### Indicating Shape

A similar habit may underlie the graphically descriptive gestures used by a professor of mathematics included in the study. Even when he did not have a piece of chalk in his hand, he was making drawings and diagrams. "You have a sphere," and his hand, with fingers curved, sweeps over the top of the imaginary sphere. "You have a point and you cut the sphere;" a jab and a slash with extended hand. "You determine the circumference," and around sweeps the hand in a circle. These are all typically American gestures—illustrating the shapes of things.

Equally graphic, though in a different way, are some of the "words" in the Italian hand-language. Many of these are international; others are strictly Italian, understood by no one else, or perhaps shared only with other Latin-speaking races.

Unmistakable (at least among males) is the tilted fist before the face, with thumb extended. That is read instantly in any language: "Let's have a drink."

Hand toward the mouth, with fingertips bunched together: fairly clear international code for "Let's eat." But the bunched finger-tips have a special meaning in Italian: spaghetti. Italians use



forks now, but their gesture is eloquent of more primitive table manners.

But would you know what it meant if somebody tilted up his chin and then flicked his hand under it, back outwards? It means, "I don't care!" Formerly, when all men were bearded, a flick of the beard signified indifference; now it is used even by clean-shaven men. The French know and use this gesture, too: they call it "la barbe."

Equally cryptic, to a non-Italian, is this one: hand at coat-pocket level, horizontal, palm up; then drop it suddenly three or four inches, keeping same position. That stops any kind of financial approach. Without the addition of a spoken word, it means, "I'm broke!"

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Science News Letter, September 5, 1936

#### PSYCHOLOGY

## Mothers-In-Law May Cause "Hay Fever" of the Mind

**T**HE MIND can have "hay fever" too. It is not caused by ragweed, that obnoxious pest that brings on so many sneezes this time of year. But it can be caused by a mother-in-law.

That the mind can become supersensitive to certain irritants just as the unfortunate hay fever victim is supersensitive to certain pollens is pointed out by Dr. Wallace Marshall of Appleton, Wis., (*American Journal of Psychiatry*, July). He explains this parallel between mind and body in reacting to persistent irritations as a long-sought link or common ground for both biology and abnormal psychology.

The effect of ragweed pollen on the person sensitive to it is well known. This peculiar sort of sensitiveness to what is harmless to another person is called "allergy" by the physician. The similar sort of sensitiveness in the mind is termed by Dr. Marshall "psycho-allergy."

Bombardment by pollen will sensitize the allergic person so that thereafter the least whiff of that pollen will start a paroxysm of sneezing. In a comparable way, Dr. Marshall explains, overexposure to an irritative mother-in-law may make a person supersensitive to that particular irritation. Thereafter even a mention of the mother-in-law may be sufficient to start a paroxysm of rage or a tirade. The father-in-law, in this case, does not precipitate any violence any more than daisies cause hay fever.

The hay fever victim can be relieved of his symptoms by a process of desensitizing. He is given gradually increasing doses of the pollen in the form of injections until he is taking it in such large amounts that he is rendered immune to the ordinary irritation of pollen-laden air.

Likewise, Dr. Marshall encourages, the son-in-law can obtain mother-in-law "immunity" by psychoanalysis.

The "mental ragweeds," or psycho-allergens, as Dr. Marshall calls them, can be revealed by the psychiatrist's word-association test, one sometimes used with the "lie-detector" to trap those suspected of a crime.

When the person hears a key word, the "lie-detector" shows his response in the form of a change in the electric potential of his skin. That is because he has previously become sensitized mentally to that particular word. It has become for him a psycho-allergen. The record made by the "lie-detector" is an index of the emotional upset that word produced in him. In the investigation of a crime, the response may indicate the

suspect's guilt. In the patient with "mental hay fever" it identifies the irritating mental factor, as a scratch test identifies the pollen in true hay fever.

Other examples of psycho-allergy are mentioned by Dr. Marshall:

"The respiratory embarrassment which the stutterer suffers, is a psycho-allergic reaction which may have an inferiority as its basis.

"The individual who faints at the sight of blood suffers a psycho-allergic reaction which can be traced to a specific emotional upset caused by a specific psycho-allergen.

"The criminal, who kills people without the slightest sign of an emotion, may develop a refractory period and lose his nerve completely.

"The dyspso-maniac (drunkard) seeks a flight from reality in liquor. He does not drink for the sport of drinking; he imbibes because he needs a retreat from the definite psycho-allergens to which he has developed a state of hypersensitivity."

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#### CLIMATOLOGY

## Mountain in Hawaii One Of World's Wettest Spots

**D**ROUGHT-WORRIED Uncle Sam owns at least one bit of real estate where there is no lack of rain—the top of Mt. Waialeale, in the middle of the island of Kauai, westernmost of the larger islands of the Hawaiian group. There the average annual rainfall piles up to the impressive figure of 451



**NO DROUGHT HERE**

Near the top of one of Hawaii's mountains is this "lake." Here it is always wet.



TO CATCH RAIN

The raingage for Mt. Waialeale must be big. This one holds 900 inches of rain without overflowing.

inches, and total precipitations in single really rainy years have reached as much as 600 inches. It is one of the world's wettest spots.

To keep an accurate official record of this extraordinary rainfall, a huge rain-gage, bigger than a barrel, has been set up on the mountaintop. It is stoutly made of copper, and it will take care of 900 inches of rain without overflowing.

The gage is read only once a year, because it is such a nuisance to get to the summit of Waialeale. Part of the way is a ceaseless struggle with dense, wet, matted trees and shrubs, and the rest of it lies across an open stretch of low vegetation, with endless rivulets trickling between grass hummocks. And everywhere there is thick, sticky, seemingly bottomless mud. Getting stuck in the mud as a peril of mountain-climbing sounds a bit funny—but those who have had the experience on Waialeale are emphatic in their declarations that there isn't a bit of fun in it.

Earlier raingages on Waialeale were smaller, necessitating at first monthly, then quarterly ascents. The mountaineering meteorologists were not sorry, therefore, when these developed defects, and the huge, once-a-year gage was built to replace them.

At one time an effort was made to get data on evaporation rates on the summit. But the sheltered copper evaporation pans stood month after month without losing any water at all, so the

scientists gave it up as a bad job. In reading the raingage, it is simply assumed that evaporation is zero—though actually it probably does occur to the extent of some unimportantly small fraction of an inch a month.

Mt. Waialeale achieves its wetness partly through the simple fact that it thrusts its more than 5,000 feet of altitude directly into the path of the moisture-laden subtropical trade winds. Even more than this, however, it acts as a moisture trap for winds that blow near its base. Together with the slightly higher Mt. Kawaikini about a mile to the south, it is the focus of a whole nest of deep canyons, up which the

winds swoop, bringing with them condensed moisture from lower levels. Thus the summit receives a double portion of rain.

The extreme wetness of Waialeale receives dramatic emphasis from the almost desert-like conditions that prevail at a sea-level locality only fourteen miles distant. This spot, blocked off from the moisture-bearing winds by the mountains themselves, has an annual rainfall of only about eleven inches—just about that of the drier parts of Arizona. Probably nowhere in the world is there such a sudden contrast between rain-forest and desert.

*Science News Letter, September 5, 1936*

## PALEONTOLOGY

## Find Well-Preserved Sloths In Cave Resembling Stable

**D**ISCOVERY of exceptionally well preserved ground sloth remains in a cave located by an Indian near Pierces' Ferry, Grand Canyon, is spurring scientists on in their quest for additional proof that man lived 10,000 years ago in what now is the United States. Hope is felt that remains of prehistoric man will be found. First indication that man lived on this continent in ancient times was uncovered four or five years ago in Gypsum Cave, near Las Vegas, when scientists uncovered ashes and arrows in association with ground sloths.

An Indian, Willis Evans, exploring for archaeological sites along the Colorado River at the behest of Dr. M. R. Harrington, scientific adviser to the National Park Service, came upon the ground sloth cave and another containing remains of an old Indian culture.

In the ground sloth cave, eight miles from Pierces' Ferry on the Arizona side, were found two ground sloth skulls, some hide and hair of the ancient animals, dried internal parts, and dung. No internal parts were found in the Gypsum Cave excavation. CCC workers removed remains to Boulder City, 80 miles distant.

Excavation of the sloth cave, which extends irregularly 200 feet into the wall of the canyon, is expected to start at once under the direction of the Park Service. The cave is around 800 feet above water level and 4,000 feet from the brim of the canyon.

The second cave contains Indian relics

and is believed to hold traces of prehistoric animals. It lies three quarters of a mile farther up the canyon, and will be opened later for investigation. Experts anticipate that additional caves will be discovered.

When Mr. Evans spotted the first cave he instantly recognized its value to science in adding new links to the record of the continent at the close of the ice age. Dr. Chester Stock, professor of paleontology, California Institute of Technology, Pasadena, Calif., was requested by the Park Service to inspect the prehistoric remains.

Dr. Stock said:

"This discovery is easily as important as the Gypsum Cave which threw new light upon the past, especially in view of the fact that from the remains just uncovered can be obtained additional information about animals that existed at the end of the ice age and into recent times. It is a remarkable preservation from which we can get valuable information about animal forms and appearances."

Dr. Stock viewed the caves with enthusiasm because of the possibility of finding remains of ancient man. Eustace L. Furlong, curator in vertebrate paleontology, California Institute of Technology, accompanied Dr. Stock.

The interior of the ground sloth cave, on discovery, resembled a stable. Man can stand erect in the caves. Some time ago CCC workers excavated a cave near Pierces' Ferry of Indian relics.

*Science News Letter, September 5, 1936*

## INDUSTRIAL RESEARCH

## Does Revenue Act Provide Federal Research Subsidy?

**N**OT ALL the industrial companies and corporations may know it yet, but the federal "Revenue Act of 1936," which greatly upset the existing structure of corporation taxes on undivided surplus, has the effect of being a major boost for private industrial research.

Under the 1936 tax act, reveals the *Industrial Bulletin* of Arthur D. Little, Inc., a firm with a taxable income of \$100,000 would have to pay a normal tax of over \$13,000 and on top of that any extra surtax, bringing the total to more than \$31,000 or nearly 32 per cent.

The problem is how to apply this \$100,000 income in a way benefiting

the company and not have it taxable. The company could pay the \$100,000 in dividends but then the money is lost for future use by the company. Improving plant and buying new equipment would be one way out, but not a cheap one, for if land for expansion, or new equipment were purchased, the government would collect sizable taxes amounting to over \$6,000 on a \$60,000 purchase. Even life insurance premiums on the officers of the company paid out of this money would be taxable at about 32 cents on the dollar.

The alternative is to spend the anticipated earnings of the year in additional research or developmental work or on promotion, advertising and other

controllable expenses so that no taxable profit would occur.

Says the *Bulletin*:

"Under the 'Revenue Act of 1936' the government in effect gives a 32 per cent subsidy to the corporations with large potential profits who utilize their current earnings in this way. Many far-sighted business men will divert more than normal amounts of current earnings to research and to other constructive expenditures so subsidized, rather than adopt the questionable alternative of distributing all these earnings in dividends to avoid the heavy penalty surtax."

*Science News Letter, September 5, 1936*

## PHYSIOLOGY

## Locates Instinct Centers In Middle of Animal Brains

**T**HE PART of the brain concerned with instinctive actions in animals has been located by Prof. E. Grünthal of the psychiatric and neurologic clinic of Würzburg University.

Prof. Grünthal finds that the instinct centers lie in the middle part of the brain, in structures known technically as the thalamus and hypothalamus.

This location of the instinct centers resulted from investigations of structural differences in the brains of man and other animals. While most investigators in this field have looked for those structural details which are more highly developed in man than in animals, Prof. Grünthal reversed the process. He holds the opinion that while man is distinctly superior to other animals in intellectual abilities, he is as distinctly inferior in regard to instinctive action. Consequently there must be some parts in the brain of animals which show a better development and a higher degree of differentiation than man's. These parts could be regarded as the chief organs of instinct action.

In the middle part of the brain Prof. Grünthal found what he believes to be such organs of instinct. These organs contain nerve centers or nuclei, which are much more numerous and more highly differentiated in other animals than man, and show a gradual decline in numbers corresponding to the evolutionary ascent. These particular nuclei are found in relatively large numbers in the brains of bats, rabbits and mice; in lesser numbers in brains of the carnivorous animals; and are least numerous in brains of gorillas and orangs. They are of nearly the same number and type in the brains of men and chimpanzees.

*Science News Letter, September 5, 1936*

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## SCIENCE NEWS LETTER

2101 Constitution Avenue

Washington, D. C.



## MARINE BIOLOGY

NATURE  
RAMBLINGS  
by Frank Thone

Giants in the Sea

ISN'T it odd, how we stick to the notion that the biggest animals that ever lived were the giant dinosaurs, that perished from the earth millions of years before men ever were born into it!

As a matter of fact, the biggest animals that ever lived are alive right now: whales. A full-grown sperm whale is said to reach a length of ninety feet. The longest dinosaur skeleton ever unearthed approaches this length, but a great deal of this yardage—nearly two-thirds of it in fact—is taken up with slim neck and even slimmer tail. The whale is all solid chunk; even its tail is massive.

So immense are whales that they can exist at all only by being aquatic. No leg-bones anatomically possible could hold up such monsters if they undertook to be terrestrial animals; even the vast muscles they now have could not move them. There is nothing that moves more awesome than a whale in the sea, where the greater part of its weight is buoyed up by the water; nothing more monstrously helpless than a stranded whale. Leviathan afloat is a fit subject for the epic poetry of the Book of Job; Leviathan ashore is a mountain in agony.

Because whales and a few of the bigger shark species are thus dependent on water to keep them up in the world, and even to preserve their normal shape against the flattening pull of gravity, some scientists have conjectured that the biggest dinosaurs, of the brontosaurus type, must also have been at least partly water-lifted. True, they had massive legs, which may have sufficed to carry them for short distances on land, but perhaps they preferred to spend most of their days submerged or semi-submerged in the rivers and shallow lakes where they lived, and in whose muddy bottoms,

now turned to stone, we find their fossil remains.

This argument is partly supported by the enormously long necks of this dinosaurian type. These may have served as periscopes and ventilator-shafts as well as for means of reaching around a wide feeding radius with a minimum of body-locomotion.

Whales, having no necks, must solve their breathing and feeding problems differently. For whales are strictly lung-breathing animals, and must have air. It would be possible to drown a whale easily enough, if there were any way to force it under water and keep it there.

The old saurians could get food enough even with their relatively small heads, because of the wide feeding radius those interminable necks gave them. But the whale has no neck, so it must keep on the move, using its enormous mouth as a scoop-net, at least in the case of the whalebone-whales, that feed exclusively on very small animals. The sperm whales, equipped with blunt but powerful teeth, hunt giant squid that live at great depths.

*Science News Letter, September 5, 1936*

## CONSERVATION

Single Plow Furrow  
Digs Deep Gully

See Front Cover

A DEEP "canyon" which resulted from a single plow furrow is shown on the front cover of this week's SCIENCE NEWS LETTER.

The tale of this wide wound of ruin in what was once a fertile hillside is tersely told by the U. S. Soil Conservation Service: Two farmers disputed the location of a field boundary. They got a surveyor to re-locate it for them. They drove a furrow straight down the slope, to mark the newly determined line. Rain underscored this gesture of division again and again—with results as shown. It all gives rather grim emphasis to the Biblical admonition, "Agree with thine adversary quickly." Or else—!!

*Science News Letter, September 5, 1936*

The gem stones known as aquamarines occur in both green and blue colors like sea water, but the blue gems are the rarer.

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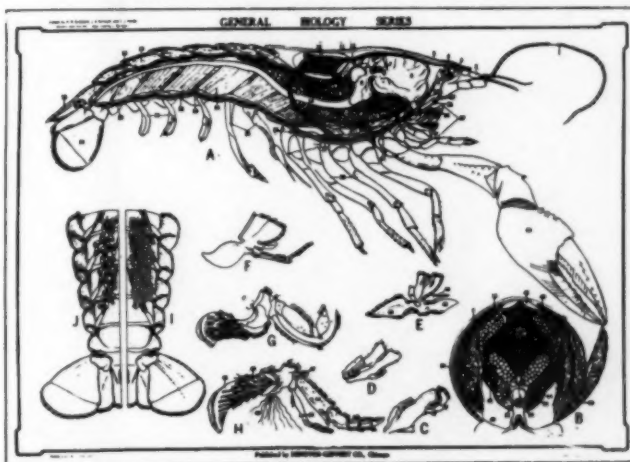


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# •First Glances at New Books

## Astronomy

**THE REALM OF THE NEBULAE**—Edwin Hubble—*Yale University Press*, 210 p., \$3. Probably no man has looked farther into the depths of space than Hubble of Mt. Wilson. Using the great 100-inch telescope, he has extended the frontiers of space enormously. This book containing his Silliman lectures is a readable, semi-technical, first-hand report of other universes.

*Science News Letter, September 5, 1936*

## Child Care

**THE YOUNG CHILD IN THE HOME**—The White House Conference—*D. Appleton-Century*, 415 p., \$3. Results of a survey of some 4,000 children in 3,000 homes. "While studies reveal a wide variation in home practices," say the authors, "they are nevertheless encouraging in that they indicate that standards of care of the young child in the American home are better than had been anticipated. On the other hand, these studies indicate that provision for physical care is on a somewhat more effective level than is that for mental and social adjustment."

*Science News Letter, September 5, 1936*

## Engineering

**AIR CONDITIONING—DESIGN AND CONSTRUCTION OF DUCTS**—Thomas J. Brett—*American Technical Society*, 226 p., \$2.50.

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## Engineering

**A MANUAL OF PHOTO-ELASTICITY FOR ENGINEERS**—L. N. G. Filon—*Cambridge, Macmillan*, 140 p., \$1.50. How to study stresses by means of polarized light.

*Science News Letter, September 5, 1936*

## Fiction

**ODD JOHN**—Olaf Stapledon—*Dutton*, 282 p., \$2. In a novel about a man far ahead of his time, the author pays his respects to the things he does not like about the world. Of course, the super-man perishes at the hands of the Great Powers.

*Science News Letter, September 5, 1936*

## Psychology

**GETTING ALONG WITH PEOPLE**—Milton Wright—*Whittlesey House*, 310 p., \$2.50. In the final chapter of this book the author claims to tell you how to become a leader. It is said to be quite simple although "serious business." As an aid you keep a chart. In the morning

you get up a half-hour earlier than usual to decide on the particular evidence of will power that you will display that day—the feeling of enthusiasm you will express—the deed of courage you will perform. Then at night you score yourself plus or minus for each item on your chart. If you find too many minuses, never mind. It will be better tomorrow. Thus the author encourages the would-be leader of men.

*Science News Letter, September 5, 1936*

## Industrial Research

**GLANCES AT INDUSTRIAL RESEARCH**—Edward R. Weidlein and William A. Hamor—*Reinhold Pub. Corp.*, 246 p., \$2.75. A comprehensive yet concise bird's-eye-view of chemistry's great aid to industry, particularly as developed at the Mellon Institute. Two leaders in that cradle of new industries discuss various aspects, from the fellowship system to science's popularization. Valuable is a compilation of progress of American chemistry since the outbreak of the World War.

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## Chemistry

**THE CHEMISTRY OF MILK**—W. L. Davies—*Van Nostrand*, 522 p., \$8. A comprehensive monograph by the research dairy chemist and analyst of Britain's National Institute for Research in Dairying.

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## Chemistry

**TEXTBOOK OF QUANTITATIVE INORGANIC ANALYSIS**—I. M. Kolthoff and E. B. Sandell—*Macmillan*, 749 p., \$4.50. Two faculty members of the University of Minnesota present a new text which aims to offer a balanced outline of the theoretical and practical aspects of inorganic quantitative analysis.

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## Conchology

**STRANGE SEA SHELLS AND THEIR STORIES**—A. Hyatt Verrill—*L. C. Page & Co.*, 206 p., \$2.50. Price correction of review which appeared in *SCIENCE NEWS LETTER* of August 1, 1936.

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## Meteorology

**FURTHER EVIDENCE ON THE DEPENDENCE OF TERRESTRIAL TEMPERATURES ON THE VARIATIONS OF SOLAR RADIATION**—C. G. Abbot—*Smithsonian Institution*, 4 p., 5c. Dr. Abbot extends his study of correlations between the fluctuations of the sun's rays and world weather to meteorological data in Potsdam, Germany, for the years from 1921 to 1934.

*Science News Letter, September 5, 1936*

## Reference Books

**THE NEW INTERNATIONAL YEAR BOOK, 1935**—Ed. by Frank H. Vizetelly—*Funk & Wagnalls*, 776 p., \$6.25. Because of special attention to science, engineering and other intellectual fields, these annual volumes are not only valuable records of progress but vehicles for facts which many have overlooked in the constant bombardment to which newspapers and magazines subject us.

*Science News Letter, September 5, 1936*

## Sociology

**SLUMS AND HOUSING**—James Ford—*Harvard University*, 2 vols., 1033 p., \$10 a set. A monumental treatment of a problem which is one of the most omnipresent and important in our modern urban civilization. New York City is taken as the city for special study, but the facts, suggestions and conclusions developed will interest those engaged in giving better shelter in other areas. There is an appendix by I. N. Phelps Stokes dealing with architecture.

*Science News Letter, September 5, 1936*

## Photography

**ENLARGING MANUAL**—Sigismund Blumann—*Photo Art*, 77 p., 50c. A useful technical manual for those who want to make big prints from smaller negatives.

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## Geophysics

**TRANSACTIONS OF THE AMERICAN GEOPHYSICAL UNION, SEVENTEENTH ANNUAL MEETING, AND WEST COAST MEETING**—*National Research Council*, 2 vols., 562 p., \$3.50.

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